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Non Invasive Imaging

EARLY DIASTOLIC UNTWIST RATE FOR ASSESSMENT OF DIASTOLIC FUNCTION; A THREE-DIMENSIONAL SPECKLE TRACKING ECHOCARDIOGRAPHY STUDY IN PATIENTS WITH HYPERTENSION AND HYPERTROPHIC VENTRICLES WITH PRESERVED EJECTION FRACTION

Poster Contributions
Hall C
Sunday, March 30, 2014, 3:45 p.m.-4:30 p.m.

Session Title: Non Invasive Imaging: Myocardial Strain, Cardiac Mechanics and Diastolic Function
Abstract Category: 15. Non Invasive Imaging: Echo
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Background: Current noninvasive indices of diastolic left ventricular (LV) function have many limitations. Left ventricular twist and untwist measurements particularly recoil events in early diastole could be useful in this regard, but information on this is limited. The aim of this study was to determine whether untwist rate by 3D speckle tracking echocardiography could serve as a feasible index of diastolic function.

Methods: We studied 171 consecutive subjects with good quality 3D echocardiograms and normal LVEF (mean age=54±19, 50% men). Significant valvular disease, prior cardiac surgery, CAD, irregular rhythm and diabetes mellitus were excluded. In addition to conventional diastolic parameters, we measured peak strain and time to peak strain (longitudinal, circumferential, radial and 3D), rotation (apical and basal), twist and torsion. Systolic twist rate and diastolic untwist rate were also derived from the generated curves. We compared different variables among three groups, normal, hypertensive and HCM using one-way analysis of variance (ANOVA) and post-hoc test.

Results: We divided the study population into three groups: Control (N=76, mean age=46±18, 47% men), HTN (N=55, mean age=66±13, 45% men) and HCM (N=40, mean age=52±18, 60% men). There was no significant difference between peak value and time to peak apical rotation, basal rotation, twist and torsion. Although peak systolic twist rate (9.2 ± 4.3, 10.0 ± 5.2, 9.4 ± 4.7 deg/s), peak diastolic untwist rate (-10.0 ± 5.0, -10.5 ± 5.0, -10.1 ± 5.0 deg/s) and time to peak systolic twist rate (191 ± 76, 200 ± 55, 175 ± 40 ms) were similar, time to peak untwist rate (416 ± 80, 452 ± 74, 458 ± 71 ms) showed significant difference between three groups (p= 0.005). While this parameter was shorter in control group compared to HTN and HCM groups (P=0.022 and 0.017, respectively), no significant difference was noted between HTN and HCM groups.

Conclusion: Time to peak untwist rate during the earliest phase of diastole appears to be a valuable parameter in identifying diastolic dysfunction in hypertensive and hypertrophic ventricles.